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CLIMATIC FACTORS AFFECTING THE NOCTURNAL EMERGENCE OF WOODLICE AND OTHER ARTHROPODS

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It has already been shown that the nocturnal emergence of woodlice (Isopoda: Oniscoidea) and other Arthropoda, as well as of molluscs, is related both to wind speed and to the temperature drop and corresponding rise in relative humidity that occur at dusk (Cloudsley-Thompson, J. L., 1958–9, *Entomologist's mon. Mag.*, **94**: 106, 184, 283; Cloudsley-Thompson, J.L. & Gupta, M., 1959, *Entomologist's mon. Mag.*, **95**: 167; Gupta, M., 1960, *Entomologist's mon. Mag.*, **96**: 172). The suggestion was made that wind inhibits woodlouse activity because it engenders a rapid rate of water loss and desiccation. On the other hand, the opposite interpretation—that on windy nights woodlice may lose their excess water load so quickly that their activity periods are very short (Den Boer, P. J., 1961, *Archs. néerl. Zool.*, **14**: 283)—also fits the facts quite well. (See discussions by Cloudsley-Thompson, J. L., 1973, *The water and temperature relations of woodlice (Isopoda: Oniscoidea)*, Watford, Herts.: Merrow Publ. Co., and by Sutton, S. L., 1972, *Woodlice*, London: Ginn & Co.). The relationship applies not only to woodlice but also to insects and Arachnida, which possess comparatively impervious integuments and so do not transpire rapidly. The largest numbers are recorded on still evenings after hot days.

TABLE 1.—NOCTURNAL EMERGENCE ON A SURREY WALL WITH RELEVANT CLIMATIC DATA (22.00 HRS. B.S.T.)

	July				August		
Date	30	31	1	2	3	4	5
Temperature	13.0	14.0	13.5	14.0	13.0	14.0	(°C)
Relative Humidity	85	90	95	80	90	90	(%)
Wind Speed	4.5	2.0	5.5	7.5	0	6.5	(m/sec
Wind Direction	S	SE	NW*	W*	—	NW*	—
Temperature Drop	6.5	3.5	4.5	1.5	2.5	0.0	(°C)

*Wall sheltered

							Total
Oniscus asellus (L.)	1	0	2	4	3	7	17
Porcellio scaber (Latr.)	3	2	2	3	0	0	10
Tachypodoiulus niger (Leach) ...	0	0	0	1	0	0	1
Lithobius melanops (Newport) ...	1	0	1	2	2	3	9
L. forficatus (L.)	0	0	2	3	3	0	8
Lasius niger (L.)	1	0	0	8	0	0	9
Leiobunum rotundum (Latr.) ...	4	2	4	4	0	4	18
Meta segmentata (Clerck) ...	4	5	5	8	4	5	31
Arion rufus (L.)	4	2	1	8	3	3	21
Helix aspersa (Müller)	0	1	2	1	0	0	4
TOTAL ANIMALS	18	12	19	42	15	22	128

The observations outlined below were made on a wall in the grounds of Haslemere Educational Museum, Surrey, while I was demonstrating at a field course in entomology, July 29th–August 5th, 1972. The wall in question faces east. It is approximately 25 m long and 1 m in height. Its western side banks up a grass lawn: the eastern aspect is constructed of brick. Counts of animals crawling on the wall were made daily at midday (zero readings except for an occasional ant) and after nightfall. The results, with relevant climatic data, are given in Table 1. Wind speed was recorded with a cup-type anemometer, placed above the wall, during the period of the night-time counts (22.00–22.15 hrs. B.S.T.). When the wind blew from a westerly direction, the wall was sheltered.

The summer of 1972 has been unusually cold and wet. August 3rd was the only day of the course on which a significant amount of sunshine was recorded. There was no clear contrast between warm and cold, wet and dry, or windy and still evenings during the period of investigation. They all tended to be cool, damp and calm. Only on August 2nd was a significantly larger ($\chi^2=27.69$) number of arthropods and molluscs recorded on the wall, and eight of them were ants. Local shelter from, or absence of wind, and larger temperature drops on August 1st and 3rd would have led one to expect an even greater emergence on those evenings. The most likely explanation of this anomaly is that emergence was inhibited at temperatures below about 13.5° C. This threshold is considerably above 5.5° C which appeared to inhibit emergence at Port Erin on March 29th and 30th, 1958 (Cloudsley-Thompson, J. L., 1958, *Entomologist's mon. Mag.*, **94**: 184) and approaches 15.5° C, which operated at Kircudbright on August 9th and 10th, 1958 (Cloudsley-Thompson, J. L., 1959, *Entomologist's mon. Mag.*, **94**: 283). It is therefore probable that the minimum threshold for nocturnal activity varies seasonally.

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